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ABSTRACT

A study investigated the results of the use of Form E (Vocabulary and Comprehension subtests) of the Nelson-Denny Reading Test (NDRT) with six successive cohorts of freshmen entering a midwestern state university. The purpose of the study was to determine the relationships existing between NDRT scores and other indicators of academic success such as high school and college grade point average (GPA), rank in class, American College Testing Program scores (ACT), and Scholastic Aptitude Test (SAT) scores. Although 11,953 subjects were tested, only the data collected from 7,635 currently enrolled students were used to form the basis of the analyses. Results revealed that NDRT scores correlated positively with ACT Composite scores, with SAT Verbal scores, and to a lesser degree with college GPA and high school GPA. Also, NDRT scores added no predictive value to equations already containing high school grades and SAT or ACT scores. Finally, the Vocabulary test of the NDRT-E exhibited effects of speed, and neither the Vocabulary nor the Comprehension tests proved to be "power" tests, i.e., neither one was likely to provide much diagnostic value as subscores. (Seven tables of data are included.) (KEH)

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The Results of Six Years of Testing College Students with Form E of the Nelson-Denny Reading Test

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Abstract

Form E of the Nelson-Denny Reading Test was administered to 11,953 freshmen who entered a mid-sized (16,000 undergraduates), state-supported, midwestern university from 1983 to 1988. After the spring semester of 1989, the college grades, ACT and SAT scores, and high school grades of 7635 current college students were matched to the NDRT files. The NDRT scores correlated positively with ACT Composite scores (r = .69), with SAT Verbal scores (r = .77) and to a lesser degree with college GPA (r = .22) and high school GPA (.26). NDRT scores added no predictive value to equations already containing high school grades and SAT or ACT scores. The Vocabulary test of the NDRT-E exhibited effects of speed, and neither the Vocabulary nor the Comprehension tests can be considered "power" tests.

The Results of Six Years of Testing College Students with Form E of the Nelson-Denny Reading Test

Forms E and F of the Nelson-Denny Reading Test (NDRT) are the latest and most carefully developed of a series of tests first created in 1929. As one of the few reading tests designed for use with both secondary and college students, the brief (35 minutes) and inexpensive NDRT has enjoyed wide use in American colleges and high schools. This newest version was published in 1981 and was designed to surpass the earlier tests in terms of technical quality and content validity. Over 1,187 vocabulary questions and nearly 600 comprehension questions were employed in trial versions, and only those questions exhibiting appropriate difficulty and high discrimination levels were included in the two comparable tests that were published.

The purpose of this report was to provide information describing the results of the use of Form E of the NDRT with six successive cohorts of freshmen entering a midwestern state university. The following areas or questions provided the central foci for this report.

1) The representativeness of the NDRT norm groups have been questioned (Tierney, 1985; Ysseldyke, 1985). Consequently, a major question involved asking about the distribution of scores produced by freshmen entering a mid-sized (16,000

undergraduates), state-supported, midwestern, four-year, multi-college university. Since institutions may use the NDRT to identify students most in need of reading instruction, a picture of score distributions at a four-year university might prove of value.

2) The Vocabulary subtest of the NDRT-E consists of 100 questions presented in only 15 minutes. Although former NDRT measures required 100 vocabulary questions to be answered in only 10 minutes, the question still remains if 15 minutes provides enough time for most students to answer 100 questions. Since the NDRT has no penalty for guessing, if the vocabulary subtest really provides too little time, a personality trait, willingness to guess, could account for some of the score variability on the NDRT.

3) Both the vocabulary and the comprehension subtests of the NDRT can be subdivided further into subtests containing different kinds of questions. The third purpose of this report involved providing the reliabilities and intercorrelations of these various subtests.

4) The students taking the NDRT were all entering freshmen, but represented two distinct groups of students--those entering through enrollment in a special summer program, and the larger group of more typical and lower-risk

students who were accepted for fall entry to the university. Do these two groups differ in their NDRT scores?

5) Construction of the two newer forms of the NDRT involved a series of item analyses and an elimination of questions that exhibited lower discriminations or inappropriate difficulty levels. What are the resulting item characteristics of the NDRT-Form E when used with freshmen entering a four-year, state-supported, mid-sized university?

6) The NDRT can be used to: (a) identify students who most need reading instruction to do well in college; and (b) predict the success of college students. Both purposes are more likely to be valid if NDRT scores actually correlate with college grades. Consequently, a major purpose of this study was to determine the relationships existing between NDRT scores and other indicators of academic success such as college grade point average (C GPA), high school grade point average (HS GPA), high school rank in class (HS DECILE), American College Testing Program scores (ACT), and Scholastic Aptitude Test (SAT) scores.

7) Since relationships among academic indicators could change as students move through their college programs, a seventh focus was upon a cross-sectional analysis of NDRT scores and other academic indicators for college freshmen, sophomores, juniors and seniors.

8) The last focus was upon the degree to which college grade point average could be predicted from high school grade point, NDRT scores and ACT scores.

Method

Subjects

The students whose scores are presented in this study were 10,805 students who began BGSU in the fall semesters of 1983 through 1988--and 1148 students who entered BGSU through the summer transition programs of 1986 through 1988. Approximately 37.7% were males and 62.3% were females. Their mean NDRT total score was 105.3 of a possible 172 points (with a standard deviation of 22.7 points). Students with zero scores on the NDRT, and students born before 1959 were excluded from the study. A subset of 7635 of these students were enrolled in the spring semester of 1989, and this group formed the basis of the analyses of the relationships between NDRT scores and other indicators of academic ability.

Measures

Form E of the NDRT consists of two subtests, Vocabulary and Comprehension. The 15-minute, 100-item Vocabulary subtest asks students to choose the best of five options to complete a sentence or define a word. The 36 multiple-choice questions of the Comprehension subtest is based upon eight passages that present information drawn from the humanities, the natural and

biological sciences, and the social sciences. Reading rate is measured by determining the number of words of the first passage that students report having read during the first minute of the Comprehension test. Form E had been statistically equated with Form F to produce a comparable pre-test and post-test system. Forms E and F also were statistically equated with their predecessors, Forms C and D. The authors of Forms E and F (Brown, Bennett & Hanna, 1981) reported an alternate-forms reliability of .92 for the Vocabulary subtest, of .77 for the Comprehension subtest, of .69 for Reading Rate, and of .91 for the Total NDRT score. The Total NDRT score is obtained by assigning one point to each of the 100 Vocabulary questions and 2 points to each of the 36 Comprehensive questions--for a maximum possible Total Score of 172 points.

The content validity of the NDRT was achieved by choosing vocabulary words and reading passages that the authors believed represented a balance between humanities, the natural and social sciences, and reading difficulties suitable for students who ranged from grades 9 through 16 (Brown, Bennett & Hanna, 1981, pp. 11-13). The questions eventually selected from a larger pool do appear to exhibit an appropriate range of difficulty levels, but at least one reviewer (Tierney, 1985) reported that "the test passages tend to be too overly obscure in their orientation for use in many high school situations" (p. 1036).

The NDRT authors suggested that the Total Score is most useful in identifying students "who may need special help with their reading" (p. 6), and also for use as a predictor of academic success (p. 7). The NDRT does, however, consist of two major subtests (Vocabulary and Comprehension), and each can be further subdivided into smaller subtests. The Vocabulary subtest includes words with and without a prefix while the Comprehension questions include 18 "largely interpretive" and 18 "primarily literal" items (p. 9).

Procedures

The NDRT-E tests were administered to entering freshmen during a pre-registration period designed to guide students into the most appropriate college classes. Fall-entering freshmen were tested in the summers of 1983 through 1988 while transitional, higher-risk, summer entrants were tested during the spring of their senior year in high school. At the end of the 1989 spring semester, the NDRT file was blended with records of students who attended during this semester.

Results

NDRT and BGSU Score Distributions (Question #1)

Table 1 presents the NDRT mean scores and deciles of three groups of students: (1) regular fall-entering freshmen; (2) higher-risk, summer transitional freshmen; and (3) students represented in the NDRT, Grade 13 -- "Beginning of the Year,"

four-year college/university norm group. The fall freshmen scores appeared to exceed the NDRT norms by from 8% (Comprehension Scores) to 16% (Total Scores). The scores from the summer transitional students were very similar to those produced by the NDRT four-year college norm group and were significantly lower (at beyond the .001 level) than those produced by the more traditional, fall-entering freshmen.

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Insert Table 1 about here

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Completion of the NDRT Vocabulary and Comprehension Subtests: (Question #2)

The time limits of Forms E and F of the NDRT require students to answer 100 vocabulary questions in 15 minutes and to answer 36 comprehension questions (reflecting eight passages) in 20 minutes. Table 2 presents the percentage of freshmen who failed to provide any answer, correct or incorrect, to each of the NDRT's 136 questions. Although approximately 99% of the students completed most of the first 20 questions in each subtest, more than one-third failed to complete the last 25 vocabulary questions and the last four comprehension questions. A majority of students failed to complete the last 17 vocabulary questions--with less than 30 percent completing the last 10 vocabulary questions.

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Insert Table 2 about here

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The Prefix and No-Prefix Vocabulary Questions and the "Literal" and "Interpretive" Comprehension Questions (Question #3)

Table 3 presents the mean scores, standard deviations, reliabilities and intercorrelations of the various NDRT-E subtests. The Total and Vocabulary scores have Coefficient Alpha internal consistencies that equal or exceed .9. The remaining subscores have lower internal consistencies that correspond to their lower numbers of questions. The Vocabulary Test's subscores are highly correlated (r = .88). The Comprehension Test's subscores are less correlated (r = .59), but also less reliable (.68 and .64). The longer and more internally consistent (Alpha = .93) Vocabulary Test is more correlated (r = .94) with the Total Test score than is the shorter and somewhat less reliable (Alpha = .78) Comprehension Test (r = .85). The "interpretive" questions of the Comprehension subtest appear to correlate more with the other subscores than do the "literal" questions of the Comprehension subtest.

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Insert Table 3 about here

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Differences Between Fall and Summer Freshmen (Question #4)

Table 1 presents the NDRT-E scores of entering freshmen drawn from both fall entering and summer, higher-risk, transitional students. The scores differ to a notable and statistically significant degree. The summer Total and Vocabulary scores tend to fall below the fall scores by approximately 13% and 18%, respectively.

Item Analyses of the NDRT-Form E (Question #5)

Table 4 presents item analyses of the 100 questions of the Vocabulary Test, and Table 5 presents similar data reflecting the 36 Comprehension questions. The mean difficulty level (% of students correctly answering the question), the standard deviation, and the correlation between the question and the sum of the other questions are presented for each question of Form E of the NDRT. The difficulty level of the Vocabulary questions exceeds .87 for the first 16 questions, drops to below the .50 point for most questions after #60, and drops into the .10 to .30 range for the last 20 Vocabulary questions--largely because of the increasing numbers of unanswered questions shown in Table 2. The discrimination values for most questions fall into or exceed the .3 to .4 range.

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Insert Table 4 about here

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The difficulty levels of the Comprehension questions (see Table 5) are also high for the initial questions and exceed .89 for eight of the first 18 questions. Eleven (69%) of the first 18 Comprehension questions have difficulty levels that exceed .80, but the difficulty levels of the last six questions fail to rise above .5--also due to unanswered questions described in Table 2. The discrimination coefficients for the first 18 questions range from .11 to .24. The discrimination coefficients for the second half of the Comprehension test are mostly in the .4 to .5 range.

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Insert Table 5 about here

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Relationships between NDRT Scores and Academic Ability

Table 6 presents two sets of correlation coefficients. Coefficients above the diagonal represent correlations between NDRT-Form E scores and other indicators of the academic ability of 7635 students who were enrolled as of the end of the spring semester of 1989. Values (in parens) below the diagonal represent correlations reported by Wood (1982) for 1598 freshmen (at the same university) who took Form C of the NDRT in the

summer of 1980 and who completed the spring quarter of 1981. The Total score of the NDRT-E correlated positively with college GPA (.22), with high school GPA (.26), with the ACT Composite score (.69), with the SAT Verbal score (.77), and with ACT English (.54), ACT Social Science (.68), and ACT Natural Science (.58). Somewhat lower relationships were found with ACT Math (.29) and SAT Math (.40) scores. In spite of the extra effort that was involved in the construction of the NDRT-Form E, scores from Form C with similar students produced somewhat higher correlations with college grades (r = .33 for Form C and .22 for Form E) and with high school grades (.32 for Form C and .26 for Form E). However, all of the data relating to Form E was drawn from students at all college grade levels (freshmen to seniors) while only freshmen grades were used for the Form C correlations.

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Insert Table 6 about here

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Differential Correlations across College Grade Levels (Question #7)

Table 7 presents correlations between NDRT-E scores and other indicators of academic ability for 1200 college freshmen, 1423 sophomores, 1623 juniors, and 3289 seniors. Approximately half of the seniors had just reached senior status (90+ semester

hours) while the other half had just reached graduation status of 122+ semester hours. The freshmen were students who took the NDRT-E in the summer but had not completed 31 semester hours by the end of the following spring. Sophomores had completed from 31 to 60 semester hours by the end of spring 1989.

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Insert Table 7 about here

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The college GPA of these students was higher for students with more credit hours--as were NDRT Total scores, HS GPA, and ACT Composite scores to a somewhat lesser degree. Some of this increase may reflect the college leaving of less able students, but the low scores of the "freshmen" may also reflect less able students or part-time students who did not accumulate the typical 30 semester hours of their first year.

Prediction of College Grade Point Average (question #8)

The best single predictor of college grade point average was high school grade point average (R = .537, n = 5941, F = 2404, $p < .0001$). Addition of the ACT Composite score increased the prediction very slightly (R = .549, F = 1284), as did the subsequent addition of high school decile rank in class (R = .551, F = 862). Nelson-Denny scores did not add any prediction to any equation already containing ACT Composite scores. Similar prediction systems functioned when separate

analyses were performed for the four class levels: $\underline{R}$ = .41 for freshmen; $\underline{R}$ = .41 for sophomores; $\underline{R}$ = .48 for juniors; and $\underline{R}$ = .54 for seniors. All of these $\underline{R}$ values were for their optimum multiple regression system, and NDRT scores entered none of the equations to increase predictions.

Discussion

The NDRT norm tables are not representative of the typical freshmen entering this midwestern, state-supported university, but are much more representative of the higher-risk, summer transition students.

The highly speeded nature of the Vocabulary section of the NDRT suggests the possibility that students could improve their scores by a considerable degree if they: (1) improved their reading speed; and/or (2) spent their last 20 seconds blindly answering their remaining unanswered questions. Since there is no penalty for guessing, blind answering of unanswered questions should increase their scores by one point for each five questions. This characteristic of the NDRT calls into question its validity and especially its use as a post-instructional measure of improved reading skill. Similar but lesser effects may be operate in the Comprehension test.

The NDRT-E appears to be a brief, inexpensive and reasonably reliable measure of at least two reading skills, Vocabulary and Comprehension. The two scores are strongly

intercorrelated (r = .85) and, consequently, are not likely to provide much diagnostic value as subscores. The low reliability and high intercorrelations of the various subtests make them even less usable as diagnostic devices. The NDRT authors suggest using the Total NDRT score for screening and predictive purposes, and this high intercorrelation across the major subscores supports their suggestion. The content validity of both Vocabulary and Comprehension tests and the effects of the Vocabulary section's speeded nature present very real problems. The low item discrimination of most of the Comprehension questions probably is associated with their difficulty values and tends to make this potentially valuable subtest too easy and too unreliable for truly effective use with moderately able college students.

The NDRT-Form E does not add predictive validity to any system that already contains high school grades and either ACT or SAT scores. Prediction tends to increase as one moves closer to college graduation. In fact, for this set of students, even the longer and much more expensive SAT and ACT tests add very little prediction of college grades if high school grades are available.

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Table 1

Scores of College Freshmen and NDRT Norm-Group Students on Form E of the Nelson-Denny Reading Test

Scores	NDRT Norm-Group 4 Yr. Grade 13	All Freshmen	Fall Freshmen	High-Risk, Summer Freshmen
Total NDRT-E[a]				
Mean Score	96.0[b]	105.3	106.7	92.4
S.D.	29.2[b]	22.7	22.4	20.7
10th Percentile	56	77	78	67
20th Percentile	69	86	87	74
30th Percentile	79	93	94	81
40th Percentile	86	99	100	86
Median	92	105	106	92
60th Percentile	101	111	112	96
70th Percentile	111	118	119	102
80th Percentile	121	125	126	109
90th Percentile	136	136	137	121
n = number	2296	11,953	10,805	1,148
Vocabulary Subtest				
Mean Score	50.8[b]	56.7	57.5	48.7
S.D.	19.0[b]	15.2	15.1	13.6
10th Percentile	26	38	39	32
20th Percentile	33	43	44	37
30th Percentile	38	48	49	41
40th Percentile	42	52	53	44
Median	48	56	57	48
60th Percentile	52	60	61	51
70th Percentile	58	64	65	54
80th Percentile	67	70	71	59
90th Percentile	78	78	78	67
n = number	2,296	11,953	10,805	1,148

Notes: See the bottom of the next page for notes a and b.

Table 1 (continued)

Scores	NDRT Norm-Group 4 Yr. Grade 13	All Freshmen	Fall Freshmen	High-Risk Summer Freshmen
Comprehension Subtest				
Mean Score	22.6[b]	24.3	24.6	21.8
S.D.	6.3	5.0	4.9	4.8
10th Percentile	14	18	18	16
20th Percentile	17	20	21	18
30th Percentile	19	22	22	19
40th Percentile	21	23	24	21
Median	23	25	25	22
60th Percentile	25	26	26	23
70th Percentile	26	27	28	24
80th Percentile	28	29	29	26
90th Percentile	30	30	31	28
n = number	2,296	11,953	10,805	1,148

Notes: [a]The NDRT Total Score = the Vocabulary Score plus twice the Comprehension Score.

[b]The NDRT norm tables do provide scores that will permit determining Form E - Grade 13 - 4-year percentile norms, but do not provide separate Form E - 4-year means and standard deviations. Consequently, the means and standard deviations in this table represent combined E and F data and combined beginning and end-of-freshman-year data for four-year colleges and universities. The Vocabulary and Total score means are probably slightly inflated by 2 or 3 raw points due to the inclusion of end-of-year freshmen in the NDRT norm data.

Table 2

Percentage of Freshmen Who Failed to Answer Each of the 136 Questions of the NDRT - Form E (N = 11,953)

Question Number	Percent Unanswered	Question Number	Percent Unanswered	Question Number	Percent Unanswered
1	.2	46	5.5	91	72.2
2	.1	47	.7	92	72.7
3	.2	48	3.0	93	74.1
4	.4	49	3.0	94	77.7
5	2.3	50	.8	95	79.1
6	1.9	51	2.6	96	78.2
7	.2	52	6.4	97	79.2
8	.2	53	7.6	98	81.8
9	.2	54	4.3	99	80.7
10	.5	55	5.2	100	79.4
11	.2	56	10.2	101	.5
12	.4	57	9.0	102	.8
13	.4	58	5.6	103	1.1
14	1.2	59	11.9	104	1.2
15	.9	60	7.9	105	.9
16	.6	61	9.9	106	1.1
17	1.1	62	10.5	107	1.4
18	3.6	63	11.1	108	1.0
19	1.9	64	12.5	109	.5
20	.7	65	16.0	110	1.1
21	.4	66	15.1	111	.3
22	1.9	67	20.8	112	.5
23	1.9	68	20.5	113	.6
24	1.4	69	22.1	114	.5
25	1.4	70	20.7	115	.6
26	5.2	71	24.8	116	.6
27	.4	72	28.5	117	.6
28	1.6	73	31.1	118	.7
29	.8	74	32.9	119	.8
30	1.7	75	34.2	120	1.2
31	2.1	76	34.6	121	1.6
32	1.6	77	38.1	122	2.2
33	4.0	78	43.2	123	2.7
34	2.1	79	47.1	124	3.4
35	.9	80	49.5	125	6.6
36	2.5	81	45.9	126	7.9
37	4.5	82	48.6	127	9.0
38	.6	83	52.4	128	10.1
39	1.7	84	54.7	129	19.1
40	1.7	85	58.3	130	20.2
41	4.1	86	62.6	131	24.4
42	2.6	87	61.3	132	26.9
43	4.0	88	65.0	133	43.3
44	1.8	89	66.1	134	47.9
45	.9	90	71.3	135	50.5
				136	53.8

Notes: [a]Questions 1 through 100 are in the timed, 15-minute Vocabulary subtest.

[b]Questions 101 through 136 are in the separately timed, 20-minute Comprehension subtest.

Table 3

Mean Scores, Standard Deviations, Reliabilities and Intercorrelations for Total, Vocabulary, Comprehension and No Prefix, Prefix, and Literal, Interpretive Subtests (N = 11,953)

Tests and Subtests	Mean	S.D.	r	1	2	3	4	5	6	7
1. Total NDRT-E[a]	105.3	22.7	.91[b]	---	.94	.85	.91	.91	.69	.82
2. Vocabulary	56.7	15.2	.93		---	.61	.97	.97	.46	.61
3. Comprehension	24.3	5.0	.78			---	.59	.60	.44	.59
4. Prefix-Vocabulary	27.9	8.2	.83				---	.88	.46	.60
5. No-Prefix Vocab.	28.7	7.3	.84					---	.46	.60
6. Literal Compreh.	14.5	2.5	.68						---	.59
7. Inter. Compreh.	9.8	1.9	.64							---

Notes: [a]The Total score is equal to Vocabulary score plus twice the Comprehension score.

[b]The reliability value represents a Coefficient Alpha, internal consistency indicator.

Table 4

Vocabulary Questions from the NDRT-E: Means, Standard Deviations and Correlations with Whole Vocabulary Score (from 11,953 freshmen entering a 4-year college)

Question	Mean	Std. Dev.	Correl.	Question	Mean	Std. Dev.	Correl.
# 1	.99	.12	.08	# 51	.75	.43	.41
2	.99	.11	.09	52	.57	.50	.46
3	.98	.12	.15	53	.41	.49	.26
4	.98	.16	.20	54	.70	.46	.30
5	.89	.31	.15	55	.75	.43	.39
6	.90	.29	.21	56	.44	.50	.32
7	.99	.10	.07	57	.46	.50	.23
8	.95	.22	.20	58	.73	.44	.43
9	.99	.09	.12	59	.51	.50	.34
10	.88	.33	.23	60	.58	.49	.45
11	.98	.15	.14	61	.47	.50	.44
12	.94	.24	.14	62	.67	.47	.43
13	.97	.18	.16	63	.54	.50	.47
14	.87	.34	.28	64	.64	.48	.43
15	.87	.34	.24	65	.38	.49	.47
16	.93	.25	.15	66	.49	.50	.55
17	.69	.46	.24	67	.40	.49	.42
18	.85	.36	.20	68	.52	.50	.52
19	.78	.42	.28	69	.36	.48	.39
20	.89	.32	.23	70	.68	.47	.54
21	.85	.36	.27	71	.35	.48	.44
22	.65	.48	.19	72	.44	.50	.51
23	.64	.48	.28	73	.31	.46	.41
24	.88	.33	.25	74	.37	.48	.49
25	.77	.42	.16	75	.34	.47	.45

(Table continues)

Table 4 (continued)

Question	Mean	Std. Dev.	Correl.	Question	Mean	Std. Dev.	Correl.
#26	.71	.45	.23	76	.37	.48	.43
27	.82	.38	.24	78	.44	.50	.65
28	.70	.46	.44	75	.22	.41	.40
29	.75	.44	.17	79	.20	.40	.45
30	.80	.40	.32	80	.22	.41	.41
31	.63	.48	.25	81	.27	.44	.52
32	.65	.48	.37	82	.33	.47	.55
33	.56	.50	.29	83	.30	.46	.60
34	.71	.45	.47	84	.17	.37	.44
35	.83	.37	.25	85	.19	.39	.55
36	.74	.44	.29	86	.21	.41	.51
37	.69	.46	.28	87	.15	.36	.43
38	.80	.40	.36	88	.16	.36	.39
39	.75	.43	.39	89	.17	.37	.47
40	.56	.50	.35	90	.15	.36	.44
41	.62	.49	.23	91	.11	.31	.37
42	.81	.40	.26	92	.10	.30	.41
43	.61	.49	.34	93	.14	.35	.50
44	.57	.50	.18	94	.06	.24	.34
45	.73	.45	.33	95	.06	.24	.35
46	.63	.48	.27	96	.09	.29	.36
47	.53	.50	.36	97	.06	.24	.35
48	.53	.50	.36	98	.04	.19	.26
49	.72	.45	.45	99	.09	.29	.40
50	.80	.40	.37	100	.14	.35	.39

Note: Overall Values: Mean = .57, S.D. = .41, Coefficient Alpha = .94

Table 5

Comprehension Questions from the NDRT-E: Means, Standard Deviations and Correlations with Total Comprehension Score (N = 11,953)

Question	Mean	Std. Dev.	Dorrel.	Question	Mean	Std. Dev.	Correl.
#101	.95	.21	.11	#119	.52	.50	.19
102	.96	.20	.18	120	.65	.48	.27
103	.94	.24	.21	121	.92	.27	.23
104	.84	.36	.23	122	.85	.36	.20
105	.70	.46	.23	123	.70	.46	.24
106	.44	.50	.17	124	.26	.44	.16
107	.56	.50	.21	125	.66	.47	.21
108	.70	.46	.21	126	.82	.38	.43
109	.89	.32	.17	127	.57	.50	.36
110	.87	.33	.19	128	.54	.50	.31
111	.89	.32	.14	129	.70	.46	.53
112	.58	.49	.11	130	.58	.49	.43
113	.96	.20	.22	131	.37	.48	.38
114	.87	.33	.20	132	.47	.50	.43
115	.60	.49	.13	133	.49	.50	.49
116	.60	.49	.24	134	.23	.42	.31
117	.97	.18	.22	135	.37	.48	.45
118	.95	.21	.22	136	.33	.47	.37

Note: Overall Values: Mean = .67; SD = .41, Coefficient Alpha = .78

Table 6

Means, Standard Deviations, and Correlations for High School and College GPA, and NDRT[a] ACT and SAT Scores

	Student GPA and Test Scores	N	Maximum Possible Score	Means	S.D.	Pearson Correlation Coefficients											
						1	2	3	4	5	6	7	8	9	10	11	12
1.	College GPA	7635	4.00	2.48	.72	---	.55	.22	.20	.20	.29	.26	.25	.22	.33	.25	.28
2.	High School GPA	6975	4.00	2.96	.51	(.55)	---	.26	.23	.26	.33	.31	.27	.26	.40	.25	.34
3.	NDRT Total Score[b]	7635	172	104.8	23.0	(.33)	(.32)	---	.94	.85	.54	.29	.68	.58	.69	.77	.40
4.	NDRT Vocabulary	7635	100	56.5	15.3	(.30)	(.28)	(.94)	---	.61	.51	.27	.66	.57	.66	.78	.39
5.	NDRT Comprehension	7635	36	24.1	5.1	(.31)	(.30)	(.87)	(.65)	---	.46	.24	.55	.46	.56	.58	.33
6.	ACT English	6662	35	19.7	4.5	(.36)	(.37)	(.64)			---	.55	.55	.48	.71	.54	.40
7.	ACT Math	6691	35	19.9	8.5	(.34)	(.35)	(.38)				---	.39	.47	.77	.26	.51
8.	ACT Social Science	6669	35	19.0	6.2	(.31)	(.24)	(.66)					---	.64	.84	.65	.41
9.	ACT Natural Science	6667	35	22.6	5.2	(.29)	(.25)	(.58)						---	.83	.57	.53
10.	ACT Composite	6664	35	20.3	4.3	(.40)	(.38)	(.71)							---	.69	.69
11.	SAT Verbal	2377	80	43.3	8.2	(.34)	(.34)	(.79)								---	.47
12.	SAT Math	2377	80	47.3	8.9	(.38)	(.38)	(.46)									---

Notes: All correlations above the diagonal were significant at beyond the .001 level.

Correlations below the diagonal represent 320 students for the SAT values and 1598 students for all other correlations.

[a]Correlations above the diagonal reflect NDRT-E score data, while correlations below the diagonal represent NDRT-C scores (n = 1598)[c] from Wood (1982)

[b]NDRT Total Score = Vocabulary + (2) Comprehension

Table 7

Means, Standard Deviations, and Correlations for NDRT Total Scores and College GPA, H.S. GPA, and ACT Composite Scores

Variables	Freshmen	Sophomores	Juniors	Seniors	All Levels
1. NDRT Total[a]					
Mean (S.D.)	99.6 (24)	103.7 (23)	104.6 (22)	106.9 (22)	104.8 (23)
N	1200	1423	1623	3289	7635
2. College GPA					
Mean (S.D.)	1.59 (.81)	2.26 (.61)	2.53 (.48)	2.86 (.47)	2.48 (.72)
N	1200	1423	1623	3289	7635
r (with NDRT)	.10	.21	.21	.26	.22
3. H.S. GPA					
Mean (S.D.)	2.64 (.54)	2.81 (.52)	2.95 (.45)	3.14 (.44)	2.96 (.51)
N	1080	1299	1478	3028	6975
r (with NDRT)	.25	.26	.20	.25	.26
4. ACT Composite					
Mean (S.D.)	18.6 (4.8)	19.7 (4.4)	20.5 (4.0)	21.0 (3.9)	20.3 (4.3)
N	996	1268	1425	2939	6664
r (with NDRT)	.73	.70	.69	.68	.69

Notes: All correlations were significant at beyond the .001 level

[a]The NDRT Total score is the sum of the Vocabulary score plus twice the Comprehension score form Form E.